CLAIMS

1. Steel for mechanical components, wherein the composition thereof is, in percentages by weight:

- $0.19\% \leq C \leq 0.25\%$;
- $1.1\% \leq Mn \leq 1.5\%$;
- $0.8\% \leq Si \leq 1.2\%$;
- $0.01\% \leq S \leq 0.09\%$;
- trace levels $\leq P \leq 0.025\%$;
- trace levels $\leq Ni \leq 0.25\%$;
- $1\% \leq Cr \leq 1.4\%$;
- $0.10\% \leq Mo \leq 0.25\%$;
- trace levels $\leq Cu \leq 0.30\%$;
- $0.010\% \leq Al \leq 0.045\%$;
- $0.010\% \leq Nb \leq 0.045\%$;
- $0.0130\% \leq N \leq 0.0300\%$;
- optionally trace levels $\leq Bi \leq 0.10\%$ and/or trace levels $\leq Pb \leq 0.12\%$

and/or trace levels $\leq Te \leq 0.015\%$ and/or trace levels $\leq Se \leq 0.030\%$ and/or trace levels $\leq Ca \leq 0.0050\%$;

the balance being iron and impurities resulting from the production operation, the chemical composition being adjusted so that the mean values J_{3m}, J_{11m}, J_{15m} and J_{25m} for five Jominy tests are such that:

$$\alpha = | J_{11m} - J_{3m} \times 14/22 - J_{25m} \times 8/22 | \leq 2.5 \text{ HRC}; \text{ and}$$

$$ß = J_{3m} - J_{15m} \leq 9 \text{ HRC}.$$

2. Steel for mechanical components according to claim 1, wherein the composition thereof is adjusted so that

$$ß = J_{3m} - J_{15m} \leq 8 \text{ HRC}.$$

3. Steel for mechanical components according to claim 1, wherein the composition thereof is:

- 0.19% ≤ C ≤ 0.25%;
- 1.2% ≤ Mn ≤ 1.5%;
- 0.85% ≤ Si ≤ 1.2%;
- 0.01% ≤ S ≤ 0.09%;
- trace levels ≤ P ≤ 0.025%;
- 0.08% ≤ Ni ≤ 0.25%;
- 1.1% ≤ Cr ≤ 1.4%;
- 0.10% ≤ Mo ≤ 0.25%;
- 0.06% ≤ Cu ≤ 0.30%;
- 0.010% ≤ Al ≤ 0.045%;
- 0.015% ≤ Nb ≤ 0.045%;
- 0.0130% ≤ N ≤ 0.0300%;
- optionally trace levels ≤ Bi ≤ 0.07% and/or trace levels ≤ Pb ≤ 0.12% and/or trace levels ≤ Te ≤ 0.010% and/or trace levels ≤ Se ≤ 0.020% and/or trace levels ≤ Ca ≤ 0.045%, the balance being iron and impurities resulting from the production operation.

4. Steel for mechanical components according to claim 3, wherein the composition thereof is:

- 0.20% ≤ C ≤ 0.25%;
- 1.21% ≤ Mn ≤ 1.45%;
- 0.85% ≤ Si ≤ 1.10%;
- 0.01% ≤ S ≤ 0.08%;
- trace levels ≤ P ≤ 0.020%;
- 0.08% ≤ Ni ≤ 0.20%;
- 1.10% ≤ Cr ≤ 1.40%;
- 0.11% ≤ Mo ≤ 0.25%;
- 0.08% ≤ Cu ≤ 0.30%;
- 0.010% ≤ Al ≤ 0.035%;
- 0.025% ≤ Nb ≤ 0.040%;
- 0.0130% ≤ N ≤ 0.0220%;

- optionally trace levels ≤ Bi ≤ 0.07% and/or trace levels ≤ Pb ≤ 0.12% and/or trace levels ≤ Te ≤ 0.010% and/or trace levels ≤ Se ≤ 0.020% and/or trace levels ≤ Ca ≤ 0.045%, the balance being iron and impurities resulting from the production operation.

5. Method for producing a mechanical component from carburised or carbonitrided steel, wherein a steel according to claim 1 is used for this purpose, on which a machining operation, carburising operation or carbonitriding operation is carried out, then a quenching operation.

6. Method according to claim 5, wherein the carburising or carbonitriding is carried out at a temperature of from 950 to 1050°C.

7. Steel mechanical component, wherein it is produced using the method according to claim 5.

8. Mechanical component according to claim 7, wherein it is a gear component.